Data Entry and Verification
Standard Operating Procedure

Revision Log

Revision	Description of Change	Author	Effective Date
1	Original document	G. Sanders	09/14/2006

Purpose

The purpose of this document is to outline the processes that should be followed when entering data into project/protocol databases. Also described are the steps that should be taken to verify and validate data once it resides in a database.

Scope and Applicability

The standards described in this document pertain to all projects conducted by the NCRN Inventory and Monitoring Program. This includes projects that are implemented using network personnel as well as those projects that are conducted for the NCRN I&M Program by other institutions through a contract or cooperative agreement.

Definitions and Acronyms

NCRN – National Capital Region Network

Verification – Pertains mainly to data that are entered from paper data sheets. It involves ensuring that the information entered into the database is the same as the data on the field data sheets.

Validation – Pertains to field data collected on paper field forms as well as data collected electronically on field computers. Validation involves checking to make sure that the data make sense. For example, if temperature value of 300 is entered it is fairly apparent that that value is incorrect.

PDA – Personal Desktop Assistant

Reference Documents

- NCRN Data Management Plan
- NCRN Vital Signs Monitoring Plan
- NCRN Data Collection Guidance Document

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Procedures and General Requirements

Entering Data From Paper Field Forms

Data Entry

- Upon returning from the field with paper data sheets, all data sheets are to be copied and the copies placed in the proper folder in the fire-proof cabinet. Originals are taken back to the offices where the data are entered.

- Data collected on paper data sheets should be entered into the project database within one week of collection. This will allow information about the sampling trip to remain fresh in the minds of the field crew in case of a question.

- Data should be entered by someone on the crew that collected it. Ideally, more than one member of he field crew should be involved during data entry. This will allow for proper interpretation of notes on the data sheet as well as increase the possibility that errors on the data sheet will be caught during data entry. If any mistakes are discovered the data should be entered correctly and a notation made on the data sheet.

- If any questions arise during data entry, the data entry personnel should make a note of any uncertainties on the data sheet as well as in the database record.

- Upon the completion of data entry, personnel should indicate who entered the data and the date it was entered in the database. The data sheets should also be dated and initialed by the person(s) entering the data.

Data Verification

Once the data for a specific sampling event has been entered, the data must be verified. This involves the following:

- Someone other than the person(s) who entered the data should review the data that was entered and compare it to the data sheets. This does not necessarily have to be someone on the field crew.

- If errors are found, the record should be corrected and a notation made in the database as well as on the data sheet.

- The verifier should indicate in the database as well as on the data sheets that they verified the data and the date on which the data were verified.

- Upon completing the data verification steps, the data sheets should be stored in a safe location off-site.

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Entering Data on Field Computers

Data Entry

- When using field computers such as tablet PC's or PDA's data is entered directly into a project database while it is being collected in the field. The advantages to this are numerous and include:
    - the database can be designed to *require* the entry of essential information such as date and location before any data is entered.
    - validation rules can be incorporated directly into the database that will identify if field crews enter information that is not valid (e.g. a temperature value of 300 degrees).
    - the availability of defined pick lists to choose from ensuring that only certain, pre-defined parameters can be entered. The use of such lists also eliminates the possibility of typos and misspellings.
    - the data entry step described above for paper field forms is eliminated. All data entry takes place in the field making the use of field computers a much more efficient means of collecting data.
- Upon returning to the office, the database file containing the new field data should be transferred to the file server and tagged with a date specific name. No data should be stored on the field computers for more than the length of a field trip.
- The new data set transferred from the field computer should be appended to the existing working data file containing all of the data collected during the current field season.

Data Verification

The data verification is process is much less of an issue when field computers are used for collecting data as there are no paper data sheets to compare with data in a database. Even though these devices help reduce the chance for errors, it is still possible to enter erroneous data (e.g. selecting the wrong species from the drop down list). Accordingly, there are certain verification steps that should be taken to ensure proper data entry.

- Prior to leaving a field site following data collection, field crews should review the data collected on the field computer to try and catch any data entry errors. Someone other than the person entering the data in the field should be directly involved with checking the data.

Data Validation

Regardless of whether field data are collected on paper data sheets or on field computers, all data must be validated. Data validation involves making sure that the data collected makes sense. Many of these checks can be incorporated into project database regardless of whether they are deployed on field computers or sit on desktop computers. The benefit of having validation checks incorporated into field databases in the field is that questionable data can immediately be flagged, checked and if need be corrected. It is important to remember that simply because

data seem unusual or identified as outliers does not make them incorrect. Before deleting or changing any such errors always double check to be sure that the information is incorrect.

Once data entry, verification and validation are complete, original data sheets should be filed. Original data sheets the copies should NOT be stored in the same location. Ideally, the originals should be stored off-site. Data sheets will be permanently archived at the Regional Museum Resource Center after five years. Copies will still be maintained in the fire-proof storage cabinet.

Responsibilities

Principle Investigator/Project Manager:

- Ensure that all members of the field crew are aware of the procedures outlining how data should be entered into project database, verified and validated.
- Make sure that field crews are entering/uploading the field data in a timely fashion as outlined in this document.
- Ensure that data undergo the proper QA/QC procedures.

Field Crews:

- Follow all data collection procedures.
- Enter/upload data into project databases in a timely fashion.
- Conduct data verification and validation checks.

Data Manager:

- Provide training and/or assistance with project databases.
- Develop database tools to assist with data entry and data QA/QC procedures.
- Ensure that all QA/QC has been conducted properly and archive data sets as needs.
- Archiving old data sheets.

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